



# U.S. DEPARTMENT OF **ENERGY**

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**FOR IMMEDIATE RELEASE:**  
**Monday, October 26, 2009**

## **Bold, Transformational Energy Research Projects Win \$151 Million in Funding**

*Department of Energy's ARPA-E selects 37 projects to pursue breakthroughs that could fundamentally change the way we use and produce energy*

(San Francisco, Calif.) The Department of Energy today announced major funding for 37 ambitious research projects – including some that could allow intermittent energy sources like wind and solar to provide a steady flow of power, or use bacteria to produce automotive fuel from sunlight, water and carbon dioxide.

The \$151 million in funding is being awarded through the Department's recently-formed Advanced Research Projects Agency-Energy ("ARPA-E"). ARPA-E's mission is to develop nimble, creative and inventive approaches to transform the global energy landscape while advancing America's technology leadership. This is the first round of projects funded under ARPA-E, which is receiving total of \$400 million under the American Recovery and Reinvestment Act.

In announcing the selections, Secretary Chu said: "After World War II, America was the unrivaled leader in basic and applied sciences. It was this leadership that led to enormous technological advances. ARPA-E is a crucial part of the new effort by the U.S. to spur the next Industrial Revolution in clean energy technologies, creating thousands of new jobs and helping cut carbon pollution."

The grants will go to projects with lead researchers in 17 states. Of the lead recipients, 43% are small businesses, 35% are educational institutions, and 19% are large corporations. In supporting these teams, ARPA-E seeks to bring together America's brightest energy innovators to pioneer a low cost, secure, and low carbon energy future for the nation.

Some of the innovative projects selected for awards include:

- Liquid Metal Grid-Scale Batteries: Created by Professor Don Sadoway, a leading MIT battery scientist, the all-liquid metal battery is based on low cost,

domestically available liquid metals with potential to break through the cost barrier required for mass adoption of large scale energy storage as part of the nation's energy grid. If successful, this battery technology could revolutionize the way electricity is used and produced on the grid, enabling round-the-clock power from America's wind and solar power resources, increasing the stability of the grid, and making blackouts a thing of the past. And if deployed at homes, it could allow individual consumers the ability to be part of a future "smart energy Internet," where they would have much greater control over their energy usage and delivery.

- Bacteria for Producing Direct Solar Hydrocarbon Biofuels: Researchers at the University of Minnesota have developed a bioreactor that has the potential to produce a flow of gasoline directly from sunlight and CO<sub>2</sub> using a symbiotic system of two organisms. First, a photosynthetic organism directly captures solar radiation and uses it to convert carbon dioxide to sugars. In the same area, another organism converts the sugars to gasoline and diesel transportation fuels. This development has the potential to greatly increase domestic production of clean fuel for our vehicles and end our reliance on foreign oil.
- CO<sub>2</sub> Capture using Artificial Enzymes: Today's funding will support an effort by the United Technologies Research Center to develop new synthetic enzymes that could make it easier and more affordable to capture carbon dioxide emissions from power plants and factories. If successful, the effort would mean a much lower energy requirement for industrial carbon capture and significantly lower capital costs to get carbon capture systems up and running. Success of this project could substantially lower the cost of carbon capture relative to current, state-of-the-art amine and ammonia based processes. This would represent a major breakthrough that could make it affordable to capture the carbon dioxide emissions from coal and natural gas power plants around the world.
- Low Cost Crystals for LED Lighting: Developed by Momentive Performance Materials, this proposal for novel crystal growth technology could dramatically lower the cost of developing light emitting diodes (LEDs), which are 30 times more efficient than incandescent bulbs and four times more efficient than compact fluorescents. This higher quality, low-cost material would offer significant breakthroughs in lowering costs of finished LED lighting, accelerating mass market use, and dramatically decreasing U.S. lighting energy usage. Lighting accounts for 14 percent of U.S. electricity use.

ARPA-E was originally established under the America Competes Act of 2007. In April, President Obama announced \$400 million in initial funding for the agency. The projects unveiled today are part of the first solicitation from ARPA-E's \$400 million in total

Recovery Act funding. The 37 selected projects, which are receiving an average of approximately \$4 million each, span the energy sector, including potentially transformative innovations in energy storage, biofuels, carbon capture, renewable power, building efficiency, vehicles, and other energy technology areas.

Inspired by the Defense Advanced Research Projects Agency (DARPA), ARPA-E was created to support high risk, high reward energy research that can provide transformative new solutions for climate change and energy security.

This first ARPA-E solicitation was highly competitive and oversubscribed, with over 3,600 initial concept papers received. Of those, approximately 300 full applications were requested and ultimately 37 final awardees through a rigorous review process with input from multiple review panels composed of leading U.S. energy science and technology experts and ARPA-E's program managers. Evaluations were based on the potential for high impact on ARPA-E's goals and scientific and technical merit.

The project selections announced today can be found [here](#).

A second set of ARPA-E funding opportunities will be announced later this fall. Please visit [www.arpa-e.energy.gov](http://www.arpa-e.energy.gov) for more information about these selections, upcoming technical workshops, and new funding opportunities.

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